CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 31, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)

CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vacuum truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 31, 2014 07:00 to January 1, 2015 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for ammonia (NH_3), chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area. Additional units (Unit 09 and Unit 10) were deployed in the cabs of excavators supporting solidification and waste removal operations in the Exclusion Zone. AreaRAEs were equipped with sensors to detect Cl_2, VOCs, LEL, H_2S, and SO_2. Unit 10 detected Cl_2 concentrations up to 0.2 ppm. The excavator operator was in an air-purifying respirator (APR) during this period. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were collocated with AreaRAE units 01, 02, 03, and 04 and data-logged to monitor PM_{10}. Additional monitors were data-logged in the cabs of excavators supporting solidification operations in the exclusion zone. Table 3 summarizes data-logged particulate monitoring data.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 31 2014 07:00 – January 1, 2015 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Community	Cl_2	Gastec 8La	6	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	24	0	NA	<1 ppm
	HCl	Gastec 14L	6	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	24	0	NA	<1 %
	O_2	MR+ / MR Pro	25	25	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	7	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	24	24	0.018	0.003 - 0.033 mg/m^3
	SO_2	MR+ / MR Pro	25	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	7	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	25	0	NA	<0.1 ppm
Exclusion Zone	Cl_2	MR+ / MR Pro	2	0	NA	<0.1 ppm
	O_2	MR+ / MR Pro	2	2	20.9	20.9 - 20.9 %
	SO_2	MR+ / MR Pro	2	0	NA	<0.1 ppm
	VOC	MR+ / MR Pro	2	0	NA	<0.1 ppm
Work Area	Cl_2	MR+ / MR Pro	24	0	NA	<0.1 ppm
	H_2S	MR+ / MR Pro	19	0	NA	<1 ppm
	LEL	MR+ / MR Pro	23	0	NA	<1 %
	NH_3	Gastec 3L	1	0	NA	<0.2 ppm
	O_2	MR+ / MR Pro	23	23	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	1	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	13	13	0.133	0.002 - 0.674 mg/m^3
	SO_2	MR+ / MR Pro	24	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	1	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	27	0	NA	<0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 31, 2014 07:00 – January 1, 2015 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Unit 01	H_2S	5513	1	0.1 ppm	0.1 - 0.1 ppm
	LEL	5513	0	NA	< 1 %
	SO_2	5513	2	0.1 ppm	0.1 - 0.1 ppm
	VOC	5513	0	NA	< 0.1 ppm
Unit 02	H_2S	5653	9	0.1 ppm	0.1 - 0.1 ppm
	LEL	5653	0	NA	< 1 %
	SO_2	5653	0	NA	< 0.1 ppm
	VOC	5653	222	0.1 ppm	0.1 - 0.2 ppm
Unit 03	H_2S	5652	0	NA	< 1 ppm
	LEL	5652	0	NA	< 1 %
	SO_2	5652	0	NA	< 0.1 ppm
	VOC	5652	0	NA	< 0.1 ppm
Unit 04	H_2S	5676	0	NA	< 1 ppm
	LEL	5676	0	NA	< 1 %
	SO_2	5676	0	NA	< 0.1 ppm
	VOC	5676	0	NA	< 0.1 ppm
Unit 09	Cl_2	2227	0	NA	< 0.1 ppm
	LEL	2227	0	NA	< 1 %
	SO_2	2227	0	NA	< 0.1 ppm
	VOC	2227	282	0.1 ppm	0.1 - 0.1 ppm
Unit 10	Cl_2	6551	305	0.1 ppm	0.1 - 0.2 ppm
	LEL	893	0	NA	< 1 %
	SO_2	6551	135	0.1 ppm	0.1 - 0.1 ppm
	VOC	6551	1	0.1 ppm	0.1 - 0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
December 31, 2014 07:00 – January 1, 2015 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10601072	AR01	5640	5640	0.02	0.004 - 0.52 mg/m^3
10503020	AR02	4988	4988	0.022	0.003 - 0.865 mg/m^3
10704075	AR03	5491	5491	0.035	0.011 - 0.847 mg/m^3
10704074	AR04	5325	5325	0.029	0.001 - 0.862 mg/m^3
10901027	Excavator 200D (AR10)	934	934	0.012	0.002 - 0.256 mg/m^3
10704070	Excavator 210G (AR09)	2316	2244	0.012	0.001 - 0.817 mg/m^3

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*

Appendix A

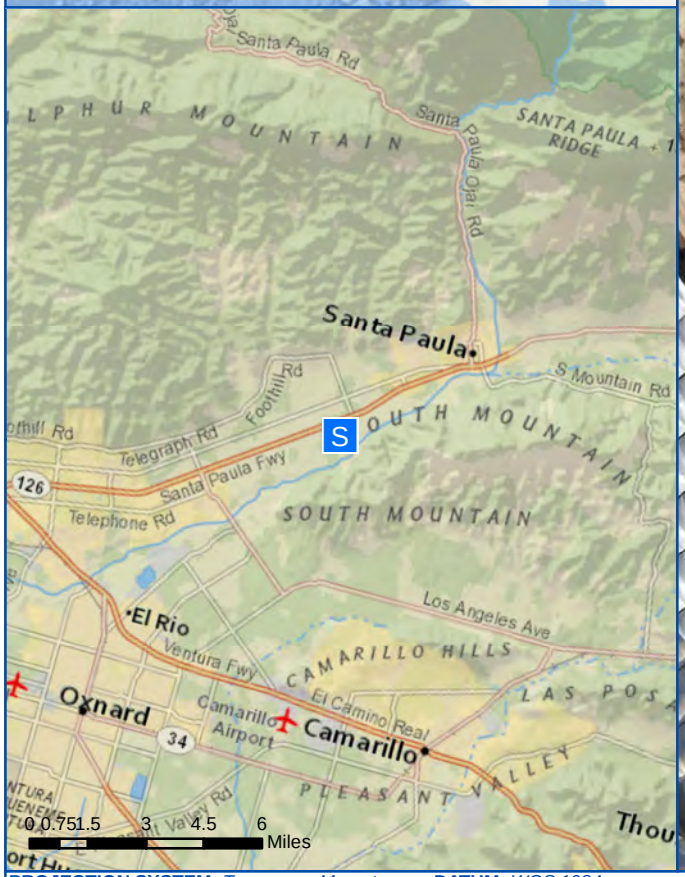
Incident Maps:

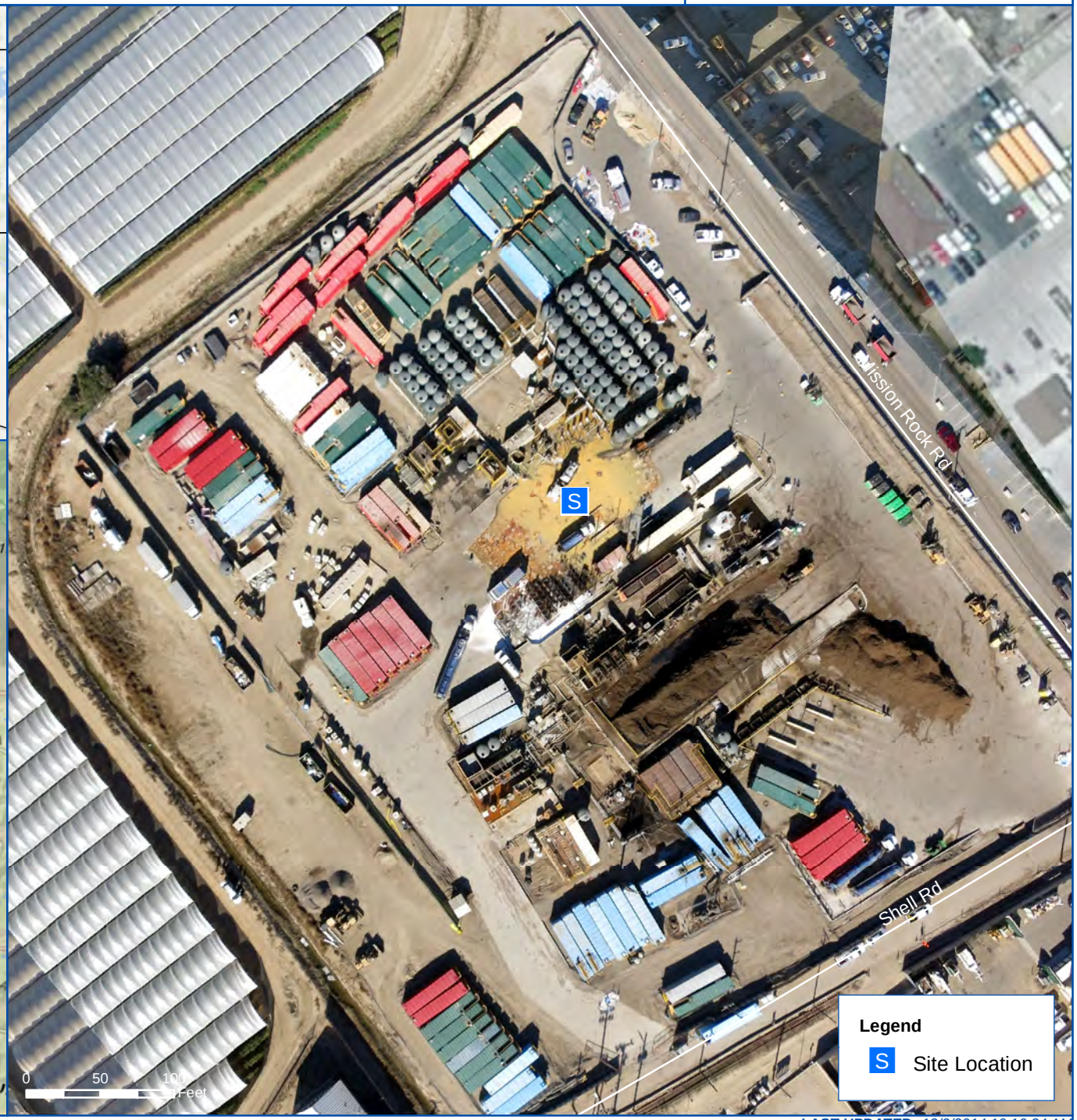
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura





PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Aerial Overview - 12/31/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *1/1/2015 10:44:44 AM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:52:47 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:54:55 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:55:56 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:57:14 AM*

Manually Logged Real-Time Air Monitoring Concentrations

NH_3 - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:58:30 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/1/2015 9:59:41 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *1/1/2015 10:01:57 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM_{10} - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/1/2015 10:04:51 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/1/2015 10:06:38 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/1/2015 10:07:41 AM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 31, 2014 07:00 to Jan 01, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *1/1/2015 10:08:42 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and Location Map

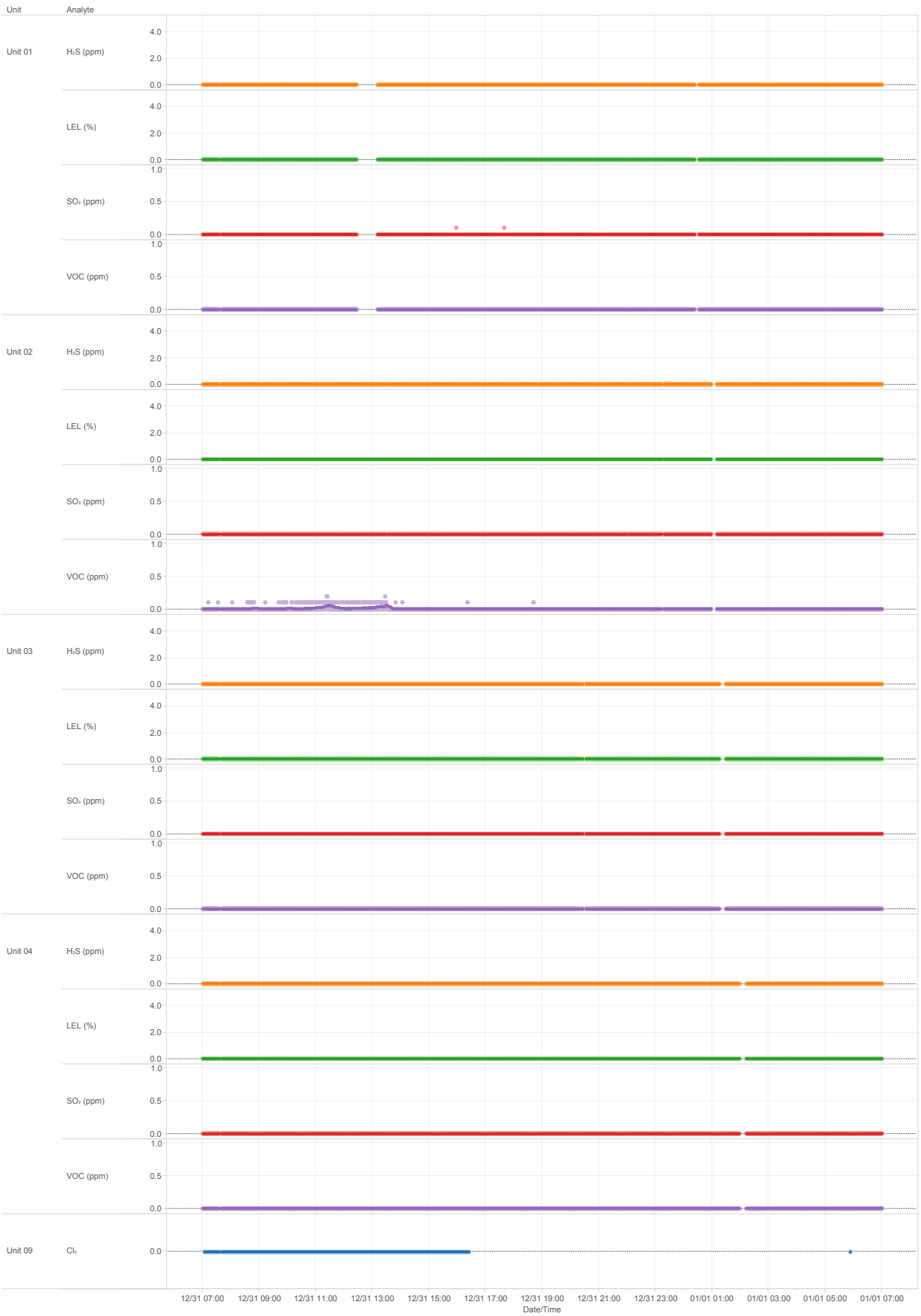
AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/31/2014 11:26:04 AM*

Patriot Environmental
AreaRAE Trend Graphs
12/31/2014 07:00 - 1/01/2015 07:00

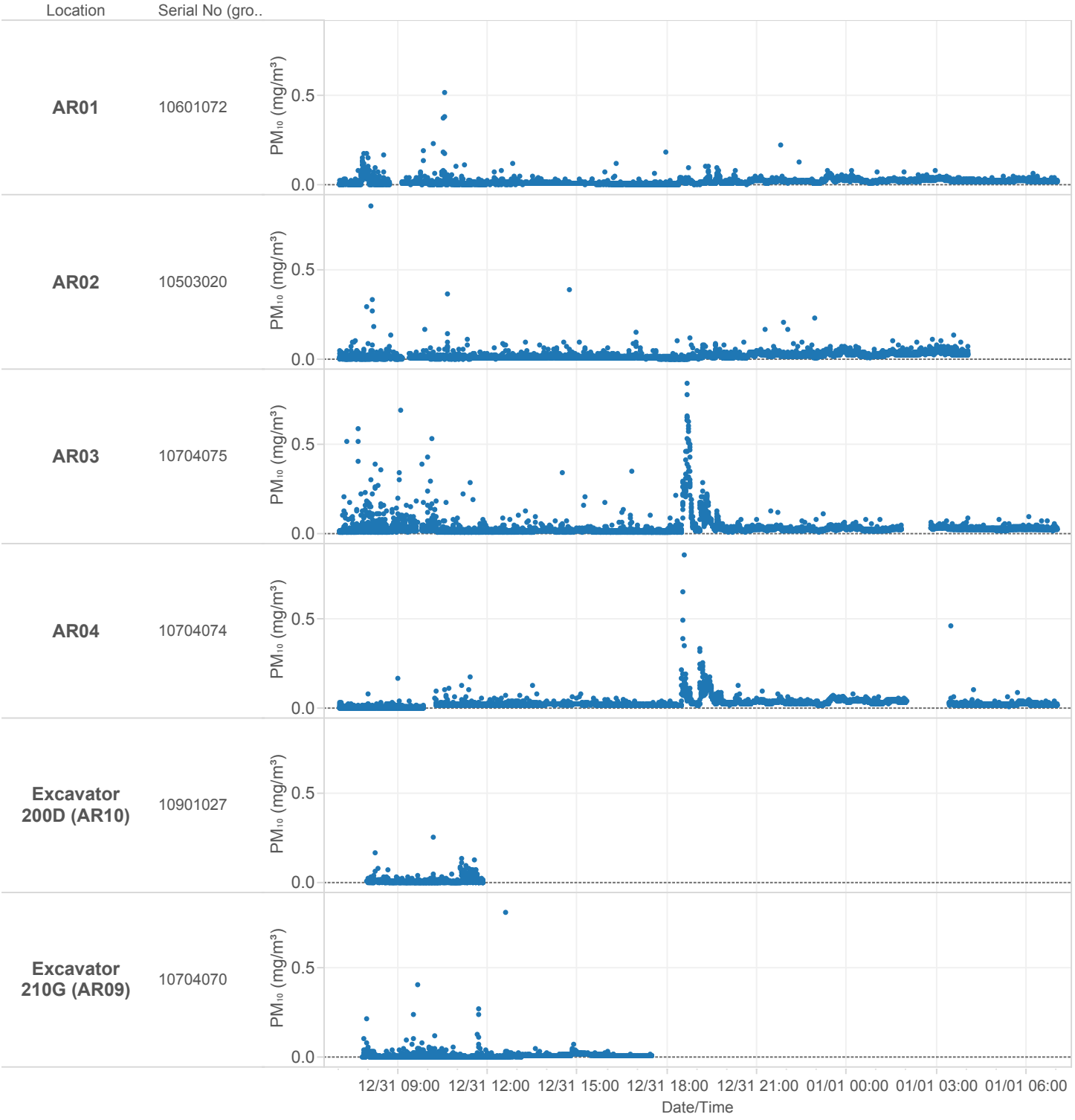


- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/31/2014 07:00 - 1/01/2015 07:00

- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
12/31/2014 07:00 - 1/01/2015 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format